

4.0 CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts result from the incremental impact of a proposed action when added to other past, present, and reasonably foreseeable future actions. Secondary impacts are those that are caused by a proposed action, but that may occur later in time or farther removed in distance, relative to the primary impacts of the proposed action (40 CFR Section 1508.7).

The 2003 SWEA considered cumulative and secondary impacts of various pending and conceptual site development projects and concluded that the incremental contribution to these cumulative and secondary impact areas would be insignificant. It also concluded that the No Action Alternative would not contribute to these impacts. The most important examples of cumulative and secondary impacts associated with the SWEA Proposed Action were as follows:

- traffic congestion at the intersections along Denver West Marriott Boulevard,
- regional and local air pollutant emissions,
- noise impacts on Pleasant View neighborhoods,
- development intensification,
- increases in Lena Gulch stormwater flows,
- habitat losses from development of natural areas,
- demand for energy, and
- beneficial impacts from improved alternative energy sources.

The Proposed Action that is the subject of this SWEA/S-II was not sufficiently far along in its conceptualization to be explicitly discussed in the SWEA. However, the preceding list of cumulative and secondary impacts bounds those associated with this Proposed Action. In general, the impacts discussed below are considered cumulative and secondary impacts in light of DOE and NREL's planned future buildout at the STM site and the ongoing private development in the area. Figure 4-1 illustrates one conceptual site plan upon full buildout; however, the figure does not illustrate mesa-top facilities or those at the far western end of the site.

Traffic Congestion

| As indicated in Figure 4-1, ~~pending subject to~~ Congressional ~~funding authorizations~~ appropriation, DOE and NREL have long-term plans for additional buildings and staffing increases at the STM site. A detailed evaluation of traffic conditions in the area was included in SWEA/S-I and is incorporated by reference into this SWEA/S-II.

| At this time, only the near-term staffing levels assessed in detail in this ~~draft~~ SWEA/S-II are realistic, as they are supported by Congressional funding actions. For the foreseeable future, the addition of a new second access road would adequately meet staffing levels on the STM site and prevent degradation of traffic conditions at local intersections to unacceptable levels.

Future projections are highly speculative; therefore, DOE and NREL propose no specific mitigation actions at this time for future speculative cumulative impacts. However, as future site buildout plans develop over the coming years, DOE and NREL would work with regional traffic authorities and determine the suite of mitigations that will best fit foreseeable staff increases so that traffic impacts from DOE's and NREL's actions can be adequately mitigated. Any future proposals would undergo a supplemental NEPA process listing mitigation measures if any.

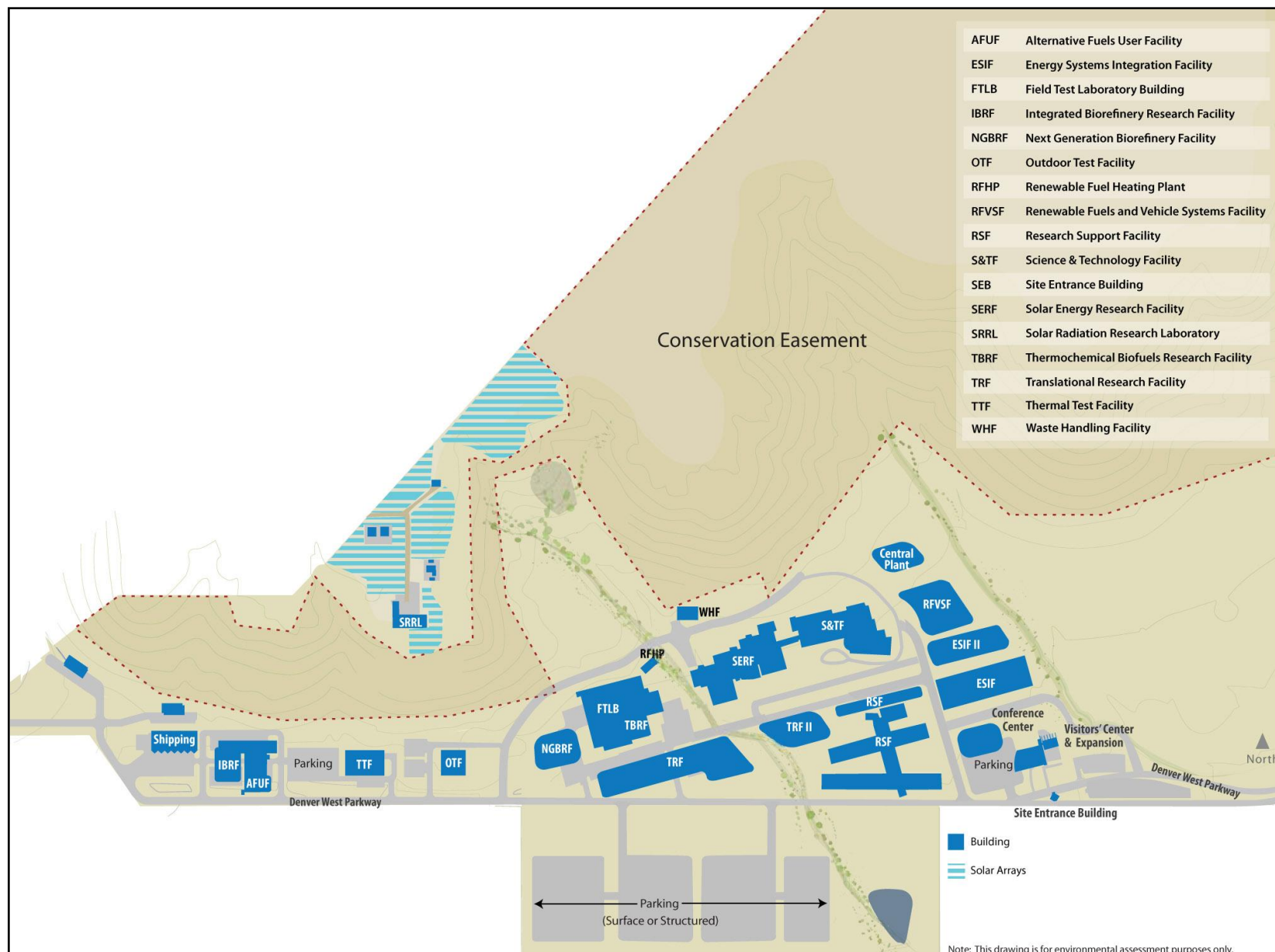


Figure 4-1. Conceptual Schematic of Site after Full Buildout

Visual Impacts

Implementation of the Proposed Action would slightly modify the overall visual impression of the STM site by adding facilities on undeveloped land. Off-site commercial development continues to occur adjacent to the STM site, further altering the visual landscape from open space to offices and residential buildings. Also, DOE anticipates further development (office or laboratories) in the northern half of Zone 6 between the proposed new parking lots and Denver West Parkway. This ongoing and planned DOE and commercial development, when added to the visual impacts described in Chapter 3, would constitute cumulative visual impacts, especially if construction occurred on Building Pad 1 in Zone 6.

Increase in Lena Gulch Stormwater

Stormwater flooding in Lena Gulch is the result of an off-site channel constriction in Camp George West Park. The Proposed Action would increase the impervious surface area on the STM site by up to 7 hectares (17 acres). Moreover, the planned further development of the STM site would further increase the impervious surface area. Similarly, projected and ongoing off-site commercial development would further increase the impervious surface area and increase stormwater runoff flows into Lena Gulch. Collectively, the Proposed Action and future developments constitute a cumulative water quality and stormwater management impact. However, the new stormwater detention basins that are part of the Proposed Action would substantially mitigate the cumulative impacts of increases in Lena Gulch stormwater flows.

Demand for Energy

Implementation of the Proposed Action would increase the STM site's overall electric power use and the demand on regional power supplies, and would challenge the adequacy of the local power distribution infrastructure. The Proposed Action itself would not require upgrades to the existing power infrastructure. However, the Proposed Action, in combination with other planned future site developments and the projected continuing local development, would eventually require Xcel Energy, the regional power utility, to upgrade the local electrical infrastructure as noted in the following excerpt from an email received from Xcel Energy in May 2007.

The circuit this customer (NREL) is currently on has 16.3 megawatts of load and a normal rating of 18.7 megawatts. It will be good for the 2009 projected increase. After that we will need to do something. This would likely be switching some of this circuit's other load on to another circuit for 2010. Ultimately with this customer's added load and the projected added load from others in the area, a new circuit will be needed in the area. We already have additional substation capacity in the area to do this from. We have added this projected load increase into our forecasts and will continue to monitor the area's load requirements. At this point I (Xcel) do not foresee any additional costs to the customer for Xcel to serve this added load.

Habitat Loss

The Proposed Action would not have direct impacts on protected species or habitats. However, it would result in the loss of 6 to 8 hectares (15 to 20 acres) of wildlife habitat and could impact migratory bird species. The Proposed Action, combined with DOE's long-term buildout vision for the STM site, ultimately would entail complete or near-complete elimination of existing wildlife habitat in Zone 6 and most, if not all, of Zone 4. However, the cumulative impact of habitat loss due to on-site development would be mitigated by the preservation of 72 hectares (177 acres) of undisturbed on-site habitat in the conservation easement, and by the fact that of the total area of the STM site (132 hectares [327 acres]).

full buildout of the site (the construction of buildings, parking, experimental pads, and roads) would impact approximately 19 hectares (48 acres), leaving 85 percent of the original site area available for wildlife.

5.0 COMMITMENT OF RESOURCES AND SHORT-TERM USES

The discussions in Sections 5.1 and 5.2 were presented in the SWEA and are directly applicable to the Proposed Action that is the subject of this ~~draft~~ SWEA/S-II.

5.1 Irreversible/Irretrievable Commitment of Resources

An irreversible commitment of resources is defined as the loss of future options. The term applies primarily to the effects of using nonrenewable resources such as minerals or cultural resources, or to those factors such as soil productivity that are renewable only over long periods. It could also apply to the loss of an experience as an indirect effect of a “permanent” change in the nature or character of the land. An irretrievable commitment of resources is defined as the loss of production, harvest, or use of natural resources. The amount of production forgone is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume production.

The Proposed Action would have no irreversible impacts on the STM site because future options for using the site would remain open. A future decommissioning process could restore the site for alternative uses, ranging from natural open space to urban development. No loss of future options would occur.

The primary irretrievable impacts of the Proposed Action would involve the use of energy, labor, materials, and funds, and the conversion of some lands from a natural condition through the construction of buildings and infrastructure. The direct losses of biological productivity and the use of natural resources from these impacts would be inconsequential.

5.2 The Relationship between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

This section addresses the commitment of resources associated with the Proposed Action relative to the loss of long-term productivity associated with these commitments.

The Proposed Action would commit resources in the form of energy, labor, materials, funds, and land over 20 years or more. The justification for these commitments is described in Section 1.3, Purpose and Need. Long-term productivity associated with the site relates to biological value as habitat and open-space values associated with aesthetic quality and recreation. The Proposed Action would be implemented at a site where substantial portions of the land are specifically reserved and preserved for these purposes. For these reasons, the incremental loss of biological and open-space values is balanced by the protections afforded to the long-term productivity of the site. Improved efficiency and increased use of renewable energy sources could substantially reduce the use of and reliance on imported fossil fuels.

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6.0 REFERENCES

- Anderson & Company, 1999a. *Ecological Assessment at Camp George West park site*. Prepared by Anderson & Company, Longmont, CO, for Pleasantview Metropolitan District and The Norris Dullea Company. July. 10 pp+ tables.
- Anderson & Company, 1999b. *Spiranthes diluvialis Survey, Camp George West park site*. Prepared by Anderson & Company, Longmont, CO, for Pleasantview Metropolitan District and The Norris Dullea Company. October. 10 pp+ photos and appendix.
- AEUB (Alberta Energy and Utilities Board), 2007. *Noise Control*. Directive 038, pg 41. February. Available at <http://www.eub.gov.ab.ca/bbs/documents/directives/Directive038.pdf>.
- Bailey, R.G., 1995. *Description of the ecoregions of the United States* (2nd ed.). 1995. Misc. Pub. No. 1391, Map scale 1:7,500,000. U.S. Department of Agriculture (USDA), Forest Service.
- Baseline (Baseline Engineering), 2009. *National Renewable Energy Laboratory South Table Mountain Facility Traffic Impact Study Revision*. Golden, CO. September.
- Boyle Engineering, 1994. *Major Drainageway Planning-Upper Lena Gulch-Phase B Report*. Prepared for the Urban Drainage and Flood Control District. March. Available at http://www.udfcd.org/downloads/down_pub_mdp.htm.
- CDOW (Colorado Division of Wildlife), 2008. *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors*. Colorado Division of Wildlife internal report.
- DOE (U.S. Department of Energy), 2008. *Final Supplement to Final Site-wide Environmental Assessment of the National Renewable Energy Laboratory's South Table Mountain Complex, Proposed Construction and Operation of: Research Support Facilities, Infrastructure Improvements (Phase I), Upgrades to the Thermochemical User Facility and Addition of the Thermochemical BioRefinery Pilot Plant*. DOE/EA-1440-S-1. May.
- DOE (U.S. Department of Energy), 2007. *Final Environmental Assessment of Three Site Development Projects at the National Renewable Energy Laboratory South Table Mountain Site*. DOE/EA-1573. July.
- DOE (U.S. Department of Energy), 2003. *Final Site-Wide EA of the National Renewable Energy Laboratory's South Table Mountain Complex*. DOE/EA-1440. July.
- DOE (U.S. Department of Energy), 1998. *Right-of-Way Easement for Public Service Company of Colorado at the South Table Mountain Site, Golden, CO*. DOE/EA-1254. April.
- DOT (U.S. Department of Transportation), 2008. "Urbanized Areas – 2007: Selected Characteristics." Table HM-72. Prepared by the Federal Highway Administration. October. Available online at <http://www.fhwa.dot.gov/policyinformation/statistics/2007/hm72.cfm>.
- EPA (U.S. Environmental Protection Agency), 2004. *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition*. NR-009c. EPA 420-P-04-009. Revised April 2004.

EPA (U.S. Environmental Protection Agency), 1978. "Protective Noise Levels: Condensed Version of EPA Levels Document." EPA 550/9-79-100. Available online at <http://www.nonoise.org/library/levels/levels.htm>.

EPA (U.S. Environmental Protection Agency), 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. NTID 300.1. December.

FHU (Felsburg Holt & Ullevig), 2008. *National Renewable Energy Laboratory South Table Mountain Facility, Traffic Impact Study*.

Jerrett et al. (M. Jerrett, M.M. Finkelstein, J.R. Brook, M. Altaf Arain, P. Kanaroglou, D.M. Stieb, N.L. Gilbert, D. Verma, N. Finkelstein, K.R. Chapman, and M.R. Sears), 2009. "A Cohort Study of Traffic-Related Air Pollution and Mortality in Toronto, Ontario, Canada," in *Environmental Health Perspectives*, volume 117, number 5, May 2009.

Kane, David P., 1999. *Preble's Meadow Jumping Mouse Survey Report*. Prepared for Pleasantview Metropolitan District and The Norris Dullea Company. September. 11 pp+ photos and appendix.

NREL (National Renewable Energy Laboratory), 2009. *National Renewable Energy Laboratory Ten-Year Site Plan FY2009-FY2020*.

NREL (National Renewable Energy Laboratory), 2007. *Project Report for the South Table Mountain Grand Buildout Infrastructure Plan*.

NREL (National Renewable Energy Laboratory), 2006. *Spill Prevention Control and Countermeasures (SPCC) Plan for the STM*. Procedure 6.2-10.

NREL (National Renewable Energy Laboratory), 2005. *Wildlife Survey (Including Migratory Birds and Raptors) at the National Renewable Energy Laboratory South Table Mountain Site, Golden, Colorado*.

NREL (National Renewable Energy Laboratory), 2002. *Vegetation Survey, NREL South Table Mountain Site*.

NREL (National Renewable Energy Laboratory), 2001. *South Table Mountain Emissions Inventory*. July, updated for 2007.

NREL (National Renewable Energy Laboratory), 1999. *Site Conservation Easement Baseline Inventory*.

USFWS (U.S. Fish and Wildlife Service), 2004. *Preble's meadow jumping mouse (Zapus hudsonius preblei) survey guidelines*. Revised April 2004. Available online at <http://www.fws.gov/mountain-prairie/endspp/protocols/PMJM2004.pdf>.